

Online Learning Experience (OLE) Planning Grid - ITEC 7480 & 7481

Curriculum Standard (applicable to k12 only):**Interpret the structure of expressions: Limit to linear expressions and to exponential expressions with integer exponents.**

- **MCC9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.**
- **MCC9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.**
- **MCC9-12.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity.**

Student Objectives/Outcomes:	Bloom's Level:	Activities:	Assessments:
<p>Students are able to identify linear and quadratic relationships in a realistic context: the number of tiles of different types that are needed for a range of square tabletops.</p> <ul style="list-style-type: none"> • Choosing an appropriate, systematic way to collect and organize data. • Examining the data and looking for patterns; finding invariance and covariance in the numbers of different types of tile. • Generalizing using numerical, geometrical or algebraic structure. • Describing and explaining findings clearly and effectively. 	<i>Remember and Analyze</i>	<ul style="list-style-type: none"> • Students attempt the task, then review their work and formulate questions for students to answer in order for them to improve their work. • Next, they work collaboratively, in small groups prepared by teacher, to produce a better collective solution than those they produced individually. Throughout their work, they justify and explain their decisions to peers. These groups will have individual group discussion board areas. • In the same small groups, students critique examples of other students' work. 	<ul style="list-style-type: none"> • Students explain and compare the alternative approaches they have seen and used. • Finally, students work alone again to improve their individual solutions.
<p>Students will understand the notion of correlation. In particular this unit aims to identify and help students who have difficulty in:</p> <ul style="list-style-type: none"> • Understanding correlation as the degree of fit between two variables. • Making a mathematical model of a situation. • Testing and improving the model. • Communicating their reasoning clearly. • Evaluating alternative models of the situation. 	<i>Understand and Analyze</i>	<ul style="list-style-type: none"> • Students work on an assessment task <i>Drive-in Movie Theater</i> that is designed to reveal their current understanding and difficulties. You then review their work and create questions for students to answer in order to improve their methods. • Students work alone answering your questions about the same problem, then work collaboratively in small groups to produce, in the form of a poster, a better solution to the task <i>Drive-in Movie Theater</i>, than they did individually. • Working in the same small groups, students analyze sample responses to the task. • In a whole-class discussion students explain and compare the alternative methods. 	<ul style="list-style-type: none"> • In a whole-class discussion students compare and evaluate the different methods they have used.
<ul style="list-style-type: none"> • Translate between descriptive, algebraic and tabular data, and graphical representation of the functions. • Recognize how, and why, a quantity changes per unit interval. 		<ul style="list-style-type: none"> • Students work individually on the assessment task <i>Making Money?</i> designed to reveal their current understanding and difficulties working with linear and exponential functions. Review their responses and create questions for students to consider, to help them improve their work. • After a whole-class interactive introduction, students work on a series of collaborative card 	<ul style="list-style-type: none"> • Students then return to the original task, consider their own responses and the questions posed, and use what they have learned to complete a similar task in a 1 to 2 paragraph written response.

		matching tasks. <ul style="list-style-type: none"> In a whole-class discussion board, students review the main mathematical concepts of the lesson and the strategies used. 	
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Approximately 2 weeks

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Curriculum Standard (applicable to k12 only): Create equations that describe numbers or relationships: Limit A.CED.1 and A.CED.2 to linear and exponential equations, and, in the case of exponential equations, limit to situations requiring evaluation of exponential functions at integer inputs. Limit A.CED.3 to linear equations and inequalities. Limit A.CED.4 to formulas with a linear focus. MCC9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. MCC9-12.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.			
Student Objectives/Outcomes:	Bloom's Level:	Activities:	Assessments:
Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. <ul style="list-style-type: none"> If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. (Draw examples from linear and exponential functions.) 	<i>Understand</i>	<ul style="list-style-type: none"> Students will define the words; relation, domain, range, function, vertical-line test, function rule, and function notation. Students will view the PowerPoint presentation. Guided practice, based on the objectives that were covered and the ability levels of the students. During the guided practice, students will work on how to interpret functions. Students will work problems and write down their answers. 	<ul style="list-style-type: none"> Students will complete function assignment with one problem deliberately missed. Submit to discussion board and an e-mail that says the deliberately missed problem Students will check one of the others students work and they must identify the incorrect problem. They will resubmit which problem they answered incorrectly and how their peer missed the problem in an e-mail to teacher.
<ul style="list-style-type: none"> Recognize the order of algebraic operations. Recognize equivalent expressions. Understand the distributive laws of multiplication and division over addition (expansion of parentheses). 	<i>Remember</i>	<ul style="list-style-type: none"> Students will complete the <i>Putting the Fun into Functions</i> Worksheet. Students work individually on an assessment task that is designed to reveal their current understanding and difficulties. You then review their work, and formulate questions for students to answer, to help them improve their solutions. 	<ul style="list-style-type: none"> In a whole-class discussion board, students find different representations of expressions and explain their answers. Finally, students return to their original assessment task, and try to improve their own responses.

		<ul style="list-style-type: none"> Students translate between word, symbol, table of values, and area representations of expressions. 	
<ul style="list-style-type: none"> Understand how the factored form of the function can identify a graph's roots. Understand how the completed square form of the function can identify a graph's maximum or minimum point. Understand how the standard form of the function can identify a graph's intercept. 	<i>Understand and Apply</i>	<ul style="list-style-type: none"> Students work on an assessment task that is designed to reveal their current understandings and difficulties. Then review their work, and create questions for students to answer in order to improve their solutions. After a whole-class interactive discussion board introduction, students work on a collaborative discussion task in which they match quadratic graphs to their algebraic representation. As they do this, they begin to link different algebraic forms of a quadratic function to particular properties of its graph. 	<ul style="list-style-type: none"> After a whole-class discussion board, students return to their original assessment tasks and try to improve their own responses. Discussion Board posts
<ul style="list-style-type: none"> Recognize the differences between equations and identities. Substitute numbers into algebraic statements in order to test their validity in special cases. Resist common errors when manipulating expressions such as $2(x - 3) = 2x - 3$; $(x + 3)^2 = x^2 + 3^2$. Carry out correct algebraic manipulations. 	<i>Apply and Create</i>	<ul style="list-style-type: none"> Each student will need two copies of the assessment task <i>Equations and Identities</i>, a mini-whiteboard, a pen, and an eraser. Each student will need <i>Card Set: Always, Sometimes, or Never True?</i> (have them cut into cards), a marker pen, a glue stick, and a large sheet of paper for making a poster. There is a projector resource to support the whole-class introduction. 	<ul style="list-style-type: none"> Students will take photo of completed glued assignment for their submission. Grading on completion and accuracy. Discussion Board posts
<ul style="list-style-type: none"> Solving a problem using two linear equations with two variables. Interpreting the meaning of algebraic expressions. 	Analyze	<ul style="list-style-type: none"> Students work on the assessment task <i>Notebooks and Pens</i>. Then review their work and create questions for students to answer in order to improve their solutions. Students then compare and discuss their solutions in discussion board. Students evaluate some sample solutions of the same task. In a whole-class discussion board, students explain and compare the alternative solution strategies they have seen and used. Each student will need a blank sheet of paper and copies of the four sheets <i>Sample Student Work</i>. 	<ul style="list-style-type: none"> Finally, students use what they have learned to revise their work on <i>Notebooks and Pens</i>. Discussion Board posts

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Online Learning Experience ITEC 748

Approximately 3-4 weeks